INITIAL SITE INVESTIGATION REPORT

FORMER GO-GO GAS
Springfield Shopping Plaza
Vermont Route 11
Springfield, Vermont

(VT DEC SITE #96-2017)

19 November 1996

Prepared for:

S. R. Young, Inc.
Springfield Shopping Plaza
Springfield, Vermont 05156

Contact: Richard Young
Phone: 802-885-4551

Prepared by:

Ground Water of Vermont
1 Mill Street, Box C-5
Burlington, VT 05401

Contact: Robert J. Ross, CGWP
Phone: 802-860-6065

GWV Project #: V96-042
GWV Document #: 96042R02.DOC

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EXECUTIVE SUMMARY

Ground Water of Vermont (GWV) has conducted an initial site investigation at the former Go-Go Gas Station located at the Springfield Shopping Plaza in Springfield, Vermont and has concluded the following:

- Gasoline has been released to the subsurface at the site. Free-phase gasoline was discovered at the site in an area encompassing approximately 700 square feet, with a total estimated volume of 1,000 gallons. Soils in the vicinity of the removed gasoline underground storage tanks (USTs) had elevated photoionization detector (PID) readings, and gasoline compounds were detected at levels above Vermont Ground Water Enforcement Standards (VGES) in ground water at the site.
- Observations made during the UST closure, and the distribution of dissolved-phase contamination and free-phase gasoline suggest that the subsurface contamination is principally a result of gasoline releases in the vicinity of the USTs and the former pump island.
- The lateral extent of dissolved-phase contamination and free-phase gasoline contamination appears to have been adequately determined.
- Approximately 19.5 gallons of gasoline have been removed from the wells by hand bailing, during eight site visits between 5 September and 24 October 1996. Product thickness in the wells has generally ranged from 0.1 to 2.3 feet, and has shown only a slight declining trend.
- On 18 October 1996, GWV installed and began operating an automated product-recovery pump in monitoring well MW-2. As of 24 October 1996, the pumping system had recovered an estimated 2 gallons of gasoline.
- Subsurface contamination at the site does not appear to pose a potential threat to indoor air quality of the adjacent buildings, due to the fact that all of the on-site buildings are constructed on concrete slab foundations, and utility entrances are sealed in concrete. No elevated PID readings were observed in any of these buildings during a September 1996 screening.
- Subsurface contamination at the site could pose a potential oxygen-deficient or explosion hazard due to the possible accumulation of gasoline vapors in sewer lines and the storm water drainage system located within or adjacent to the contaminant plume. The risks to these underground utilities have not been adequately evaluated to date.
- No drinking-water supplies appear to be at risk from the contamination at the site. The location of water-supply lines serving nearby buildings has not been determined, however.

On the basis of the results of this investigation, GWV makes the following recommendations:

1. The site should be visited bi-weekly, to maintain and collect data on the performance of the product recovery system, to measure water and product elevations in the on-site wells in and near the product plume, and to recover by hand bailing accumulated product in the wells at the site.
2. All utility manholes and storm drains in the vicinity of the free-product and dissolved contamination plumes should be inspected and field-screened with a PID to evaluate whether gasoline vapors are accumulating. The locations of all underground utilities in the vicinity of the contaminant plumes should be surveyed.
3. The on-site monitoring wells that do not contain free-product should be sampled and analyzed for BTEX compounds and MTBE by EPA Method 8020 on a quarterly basis beginning in November 1996.
4. Product recovery data, analytical results from the November ground-water monitoring event, and manhole/storm drain PID readings should be used to prepare an initial remedial progress report. The report should evaluate whether more aggressive remedial options should be considered at the site.

1.0 INTRODUCTION

This report details the results of an initial site investigation conducted at the former Go-Go Gas Station, located on the Springfield Shopping Plaza property at the junction of Vermont Routes 106 and 11 in the town of Springfield, Vermont (Figure 1). This report has been prepared by Ground Water of Vermont (GWV) for S. R. Young, Inc. under the direction of Mr. Richard Young. The site investigation was initiated with Vermont Department of Environmental Conservation (VT DEC) approval following the discovery of subsurface petroleum contamination during the removal of five underground storage tanks (USTs) on 25 July 1996.

1.1 Site Location and Physical Setting

The former Go-Go Gas station was an automotive fuel distribution outlet, located on the northern portion of the Springfield Shopping Plaza property (Figure 2). The ground surface, most of which is paved, is relatively flat with an average elevation of about 450 feet above mean sea level. Surface drainage appears to be controlled by the slope of the pavement and the on-site storm-water system. The presumed direction of ground-water flow in the area is generally toward the south in the direction of the Black River, which meanders around the eastern, southern, and western sides of the shopping plaza. The closest point of the Black River that is located downgradient of the gas station is about 500 feet to the southwest (USGS, 1984).

Drinking water for the site and other surrounding buildings is supplied by the Springfield municipal water system, which is located approximately one mile to the northwest on Fairground Road. The municipal water supply system consists of a series of supply wells adjacent to the Black River (Burton, 1996). The site and all buildings in the vicinity are served by a municipal waste-water system. Numerous underground utilities are located on the site and adjacent properties.

Native surficial materials in the vicinity of the site are mapped as pebbly sands and recent alluvial deposits consisting of sands and gravels (Stewart and MacClintock, 1970). Bedrock in the area is mapped as the Waits River Formation, which is composed of gray quartzose and micaceous crystalline limestone of lower Devonian age (Doll, 1961). No bedrock outcroppings were observed at the site.

1.2 Site History

The site is currently owned by Springfield Realty. According to Mr. Richard Young, Springfield Realty purchased the property around 1961 and began leasing the property to S.R. Young, Inc. in 1970. The USTs removed in July 1996 were installed in 1970, and permitted to S.R. Young, Inc. No previous USTs are known to have existed at this location. Until the USTs were removed in July 1996, the Go-Go Gas station was operated by the Bradford Oil Company, under a lease agreement with S. R. Young, Inc.

Five 4,000-gallon single-walled steel gasoline USTs owned by S. R. Young, Inc. were removed on 25 July 1996. The UST cleaning and purging were performed on the same day by MacIntyre Corporation of Middlebury, Vermont. Gurney Earth Movers of North Springfield provided excavation services for the closure. An UST closure assessment was performed by Ground Water of Vermont (GWV) on the day of removal. The UST closure report, dated 31 July 1996, was submitted to Mr. Young and the VT DEC, with a copy sent to Bradford Oil Company.

Two of the tanks, which were manifolded together, had been taken out of service in the spring of 1996 due to the discovery of water in one of the tanks. The other three tanks were in service until the time of removal. All of the USTs were found to be in poor condition upon removal, with evidence of releases. The releases appeared to be due to a combination of historical overfills, piping leaks, and leakage from holes observed in the bottoms of four out of the five USTs. Holes in the USTs ranged in size from about 1/8 to 1/2 inch in diameter. Minor piping leaks were noted at all four of the fuel pumps and at the submersible pump assemblies.

The UST excavation extended to a depth of about 11 feet below ground surface (bgs). Excavated soils below the water table, around the submersible pumps, and under the pumps at the island exhibited weathered petroleum staining. PID readings on soils from the UST excavation and under the pumps ranged from 17.6 to 470 parts per million (ppm), with an average of approximately 150 ppm. All of the excavated soils were backfilled due to the presence of contamination below the water table and underground utilities. Ground water was observed in the excavation at approximately 5 feet bgs, with globules of apparently old gasoline product and sheens observed on the water surface.

GWV initiated an initial site investigation under the VT DEC site investigation "Expressway" process after receiving approval on 19 July 1996 from Mr. Richard Young of S. R. Young, Inc. and Matthew Moran of the VT DEC.

1.3 Objectives and Scope of Work

The objectives of this initial site investigation were to:

- Evaluate the degree and extent of petroleum contamination in soil and ground water;
- Qualitatively assess the risks to environmental and public health via relevant sensitive receptors and potential contaminant migration pathways; and
- Identify potentially appropriate monitoring and/or remedial actions based on the site conditions.

To accomplish these purposes, GWV has:

- Reviewed existing historical site data.
- Supervised the advancement of 19 soil borings and the installation of monitoring wells in 15 of the borings.
- Screened subsurface soils from the soil borings for the possible presence of volatile organic compounds (VOCs) using a photoionization detector (PID).
- Measured water and product levels in the monitoring wells.
- Calculated the local ground-water flow direction, gradient, and estimated velocity.
- Estimated the volume of free-phase product at the site.
- Collected and submitted ground-water samples from the monitoring wells for laboratory analysis of gasoline VOCs.
- Identified sensitive receptors in the area, and assessed the risk posed by the contamination to these potential receptors.
- Evaluated the need for treatment and/or a long-term monitoring plan for the site.
- Prepared this summary report, which details the work performed, qualitatively assesses risks, provides conclusions and offers recommendations for further action.

2.0 INVESTIGATIVE PROCEDURES AND RESULTS

2.1 Soil Boring / Monitoring Well Installation

During the tank removal activities on 25 July 1996, one monitoring well (MW-1) was placed within the UST excavation. The monitoring well consisted of a 5-foot section of two-inch-diameter machine-slotted PVC with solid riser extending to ground surface. The bottom of the well was set at approximately 11 feet below ground surface (bgs) and backfilled with soil from the excavation. The completed monitoring well was protected by a flush-mounted steel roadbox cemented into place at ground surface. A water-tight compression cap was placed on top of the PVC riser.

On 28 August 1996, GWV supervised the completion of four soil borings/monitoring wells (MW-2 through MW-5). Due to the discovery of free-phase gasoline floating on the water table ("free product"), six additional boring/wells (MW-6, MW-10, MW-11, MW-12, MW-13, and MW-15) and four borings (SB-7, SB-8, SB-9 and SB-14) were installed on 5 September 1996 and four additional borings/wells (MW-16 through MW-19) were installed on 17 September 1996, in order to define the extent of free-phase and dissolved contamination. Approximate well and boring locations are shown on Figure 3 in Appendix A. The soil borings and monitoring wells were installed using a vibratory drilling technique by Adams Engineering of Underhill, Vermont.

The soils encountered in each boring generally consisted of medium-to-fine brown sands with a trace of gravel. The borings were completed to depths ranging from about 11 to 16 feet bgs. Ground water was encountered in each boring at approximately five feet bgs. Soil samples were collected continuously from each boring using a five-foot-long core tube. Soil recovery was fair to very good, ranging between 20 and 100 percent. The core-tube samples were screened for the possible presence of VOCs with a photo-ionization detector (PID) and logged for lithology by a GWV field geologist. All downhole drilling and sampling equipment was decontaminated during use as appropriate.

Two-inch-diameter PVC monitoring wells with 10 feet of 0.010-inch slots were installed in each well location to depths ranging between 11 to 14 feet bgs. The tops of the screen sections were set at about two to four feet above the apparent ground-water surface in order to accommodate seasonal ground-water level fluctuations and to allow for the measurement of possible free product. Sections of solid PVC were added to bring the tops of the well casings to approximately 0.5 feet bgs. Clean silica #1 filter sand was placed in the borehole annulus around each well to nominally one foot above the slotted interval. A bentonite pellet seal, at least one-foot thick, was set above the sand pack and the remainder of the annular space was backfilled with native material. Each completed monitoring well was protected by a flush-mounted steel roadbox cemented into place. Each well casing was topped with a water-tight compression cap. Monitoring-well construction details are included on the soil-boring and well-construction logs in Appendix B.

All of the monitoring wells were developed by peristaltic pump following installation, except MW-2, MW-11, MW-12, MW-15, and MW-18, which were not developed due to the presence of free-product. Each monitoring well produced moderate amounts of water and

cleaned up relatively quickly. Development water was discharged directly to the ground surface in the vicinity of each well.

2.2 Soil-Screening Results

PID readings on soils collected during the UST closure ranged between 17.6 and 470 ppm, with an average of about 150 ppm. The highest PID readings were detected on soils beneath the pumps and USTs. PID readings at monitoring well MW-1, located inside the excavated area, ranged between 80 to 376 ppm.

During the completion of soil borings for MW-2, MW-3, MW-4, and MW-5 on 28 August 1996, PID field-screening results of soil samples collected from the four soil borings ranged between 0.3 and 362 parts per million (ppm), with the highest PID readings (> 200 ppm) encountered just above or at the water table in each boring. PID readings within the unsaturated zone ranged from 33.6 to 219 ppm. Strong petroleum odors were noted at each of these locations during soil boring activities.

During the completion of ten soil borings on 5 and 6 September 1996, PID field-screening results of soil samples ranged between 0.2 and 344 ppm, with the highest PID readings (> 190 ppm) encountered in MW-11 and MW-12, where free product was subsequently detected. PID readings on soil samples collected from MW-6, MW-13, SB-7, SB-8, SB-9, and SB-14 ranged from 0.0 to 18.6 ppm.

PID field-screening results on soil samples collected from the soil boring for MW-18, completed on 17 September 1996, ranged between 202 and 364 ppm. The PID readings for the other three borings (MW-16, MW-17, and MW-19) completed on 17 September 1996 were generally less than 0.7 ppm. PID screening results are included on the boring logs in Appendix B.

The GWV field geologist screened soil samples from each soil boring for the possible presence of volatile organic compounds (VOCs) using a Thermo Environmental Model 580B portable photoionization detector (PID). The PID was calibrated with an isobutylene standard gas to a benzene reference.

2.3 Determination of Ground-Water Flow Direction and Gradient

Ground water in the unconfined surficial aquifer beneath the northern part of the site appears to be flowing in a southwesterly direction, toward the Black River, at an average gradient of about 2.6 percent. In the central and southern areas, however, the ground-water flow direction still appears southwesterly, but the gradient decreases abruptly, to an estimated 0.22 percent. In the northern area, average flow velocities in the ground water moving through the medium-to-fine sand deposits are estimated to be in the range of 0.03 to 0.7 feet per day (ft/day). Average flow velocities the central and southern areas are estimated at 0.003 to 0.06 feet per day. Water-level measurements and elevation calculations for September 1996 are presented in Table 1. The ground-water contour map in Figure 4 was prepared using data from 27 September 1996.

Fluid levels were measured in the 15 monitoring wells on 27 September 1996. The depth to water varied from 2.45 feet (MW-3) to 7.88 feet (MW-6) below top-of-casing. Free-phase gasoline was observed in five of the on-site monitoring wells (MW-2, MW-11, MW-12, MW-15, and MW-18). Static water-table elevations were computed for each monitoring well by subtracting the measured or corrected depth-to-water readings from the surveyed top-of-casing elevations, which are relative to an arbitrary site datum of 100.00 feet.

The shallow aquifer at the site consists predominantly of medium-to-fine sands, which typically exhibit effective porosities of about 0.2 to 0.4 and hydraulic conductivities of about 0.6 to 5 ft/day (Domenico and Schwartz, 1990). Assuming Darcian flow, these estimated ranges of porosity and conductivity combine with the calculated ground-water gradient of 2.6 percent to yield an estimated range of ground-water flow velocities in the northern part of the surficial aquifer of between 0.04 and 0.65 ft/day, or 15 to 237 feet per year. In the central/southern area, the same estimates of effective-porosity and hydraulic conductivity, together with an estimated gradient of 0.22 percent, yields an estimated range of velocities of 0.003 to 0.055 ft/day, or 1 to 20 feet per year.

2.4 Ground-Water Sampling and Analysis

Review of the ground-water analytical results indicates that residual ground-water contamination at the site extends from the former USTs and pump island toward the south and southeast in the direction of the Black River. The highest dissolved-phase concentrations were detected in MW-5, located about five feet south of the former pump island. The Vermont Groundwater Enforcement Standards (VGESs)[1] for all of the BTEX (benzene, toluene, ethylbenzene, and xylenes) compounds and the Vermont Health Advisory (VHA) for the gasoline additive methyl-tertiary butyl ether (MTBE) were exceeded in the sample collected from MW-5. The VGES for benzene was also exceeded at MW-1, MW-3, MW-6, MW-10, and MW-13. The VGES for total xylenes was also exceeded at MW-1 and the VHA for MTBE was also exceeded at locations MW-10, MW-13, MW-16, and MW-19. Ground-water analytical results are summarized in Table 2. A contaminant distribution map of total BTEX and MTBE is presented as Figure 5. Laboratory report forms are included in Appendix C.

Ground-water samples were collected from seven monitoring wells on 13 September 1996 and from three new monitoring wells on 27 September 1996. Each monitoring well was purged and then sampled using the dedicated bailer and dropline left hanging inside the well casing following development. Purge water was discharged directly to the ground in the vicinity of each well. Trip blank and duplicate samples were collected during each sampling event for quality assurance/quality control (QA/QC) purposes. All field procedures were conducted in accordance with GWV standard protocols.

[1]The Vermont DEC has established Groundwater Enforcement Standards (VGESs) for four petroleum related VOCs, as follows: benzene - 5 ppb; toluene - 2,420 ppb; ethylbenzene - 680 ppb; and xylenes - 400 ppb. The Vermont Health Advisory (VHA) for MTBE, a gasoline additive, has been established as 40 ppb.

The ground-water samples were submitted to Endyne, Inc. of Williston, Vermont where they were analyzed for the possible presence of benzene, toluene, ethylbenzene, xylenes (BTEX) and methyl-tertiary butyl ether (MTBE) by EPA Method 8020. Analytical results from the QA/QC samples indicate that adequate QA/QC was maintained during sample collection and analysis. None of the BTEX compounds or MTBE were detected in either of the trip blank samples and the analytical results for the blind field duplicate samples fell within about ten percent of the original sample results.

2.5 Free Product Monitoring and Recovery

On 29 August 1996, free-phase gasoline was discovered floating on the water table in monitoring well MW-2. Since that date, free-phase gasoline has been detected in four other monitoring wells installed on-site (MW-11, MW-12, MW-15, and MW-18), at thickness ranging from 0.02 feet (MW-18) to over two feet (MW-2, MW-11, MW-12 and MW-15). GWV has periodically measured the product thickness and has removed accumulated gasoline from these wells. As of 24 October 1996, approximately 21.5 gallons of gasoline have been recovered from the site through a combination of hand bailing and automatic pump operation. A summary of the product thickness measurements and recovery data is included in Figures 6 through 11.

During eight site visits between 5 September and 24 October 1996, approximately 19.5 gallons of gasoline were recovered by hand bailing and stored temporarily in a drum at the site prior to proper off-site disposal. Product thickness in each well has generally been between 0.1 and 2.3 feet, and total recovery volumes during each visit have generally been between 2 and 4 gallons. The thickness of the free-phase gasoline has generally shown a slight decrease since hand bailing began in September 1996; however, between the 18 and 24 October site visits, the product level decreased significantly at each location corresponding with a rise in the water table elevation.

On 18 October 1996, GWV installed a Spill Terminator automatic product recovery pump, manufactured by Clean Earth Technology, Inc. of North Ferrisburg, Vermont, in monitoring well MW-2. As of 24 October 1996, the system has recovered approximately 2 gallons. Based on the location of the monitoring wells containing free-phase gasoline and conservatively assuming free-phase gasoline encompasses an area of approximately 700 square feet with an estimated average "true gasoline thickness" of 0.20 feet, an estimated total volume of about 1,000 gallons of gasoline are present in the subsurface at the site (U.S. EPA 1994).

3.0 SENSITIVE RECEPTOR SURVEY AND RISK ASSESSMENT

3.1 Sensitive Receptor Survey

GWV conducted a survey to identify sensitive receptors in the vicinity of the site that could potentially be impacted by vapor- or dissolved-phase gasoline contamination. The following sensitive receptors were identified in the vicinity of the site:

- The Black River, whose closest point is located approximately 400 feet southeast of the former USTs.
- The on-site sewer and storm water drainage systems located adjacent to the former USTs
- Ground water in the surficial aquifer.
- Occupied buildings located downgradient of the source area, the closest being a Price Chopper supermarket, a bowling alley, and a pool-supplies store. Other stores in the shopping plaza that may be located downgradient of the gasoline station include a Grand Union supermarket, an Ames department store, Young's Furniture, and several other retail stores.

3.2 Risk Assessment

GWV assessed the risks that the subsurface contamination poses to the receptors identified above. In general, human exposure to petroleum related contamination is possible through inhalation, ingestion, or direct contact while impacts to environmental receptors are due either to a direct release or contaminant migration through one receptor to another or along a preferential pathway.

The findings of our risk assessment indicate that the subsurface contamination at the site may pose a threat to underground utilities in the immediate vicinity of the former gasoline station. The accumulation of vapor-phase contamination in the on-site storm water drainage and sewer systems is possible considering that a sewer line, located between MW-2 and MW-10, passes through an area of shallow soil contamination. Seepage of contaminated ground water or free-phase gasoline into this system is also possible considering the reported depth of this sewer line, eight feet bgs, is at or below the water table in this area of the site. Exposure to contaminated soils is also possible, if excavation or other subsurface work is conducted in the immediate vicinity of the former gasoline station.

Other sensitive receptors identified near the site do not appear to be significantly threatened. The dissolved-phase contamination does not appear to have migrated to the Black River. The threat of direct human contact with undisturbed contaminated ground water or soils at the site is low due the depths of the contaminated media. No basements or drinking water supplies are located downgradient of the source area. All of the on-site buildings are constructed on a concrete slab foundation and are connected to the municipal water supply system, located on Fairground Road approximately one mile northwest of the site.

3.2.1 Indoor Air Quality

Residual contamination at the site does not appear to pose a threat to human health via inhalation of contaminated vapors inside occupied buildings. None of the buildings in the shopping Plaza are reported to have basements, and the utility entrances in the nearest buildings appear to be sealed in concrete. Nevertheless, GWV screened indoor air qualities in the Price Chopper and bowling alleys on 6 September 1996, using a Thermo Environmental model 588B PID. No elevated readings were detected in occupied areas or adjacent to utility entrances in either building.

3.2.2 Direct Soil / Ground-Water Contact

The risk of human exposure through direct contact with contaminated soils is considered to be low at the site, considering that a majority of the petroleum contaminated soils are located at a depth greater than 3 feet bgs. However, direct contact with potentially contaminated soil is likely, if any subsurface exploratory or construction work is conducted in the vicinity of the site. The risk of human exposure through direct contact with contaminated ground water is considered to be very low at the site, considering that the depth to ground water is generally greater than 5 feet bgs.

3.2.3 Surface-Water Quality

The nearest surface water body is the Black River, which is located approximately 400 feet southwest of the Go-Go Gas Station. Current information suggests that it is unlikely that contamination from the site has migrated to this surface water body.

3.2.4 Drinking Water Supplies

Although the shallow surficial aquifer adjacent to and downgradient of the former USTs has been impacted by petroleum contamination, current information suggests that no drinking water supplies are at risk. The risk of contaminant entry into water lines, however has not been adequately evaluated because the location of underground water lines serving the nearby building remains uncertain.

Drinking water for the site and other surrounding buildings is supplied by a public water system, which is managed by the Springfield Public Works Department. According to Mr. Kurt Burton of the Springfield Public Works Department, the source of water is three well fields located on Fairground Road, approximately one mile northwest of the site, in the apparent up gradient direction from the former USTs..

3.2.5 Confined Spaces and Underground Utilities

Accumulated gasoline vapors in underground utility lines and manholes can pose explosion hazards, and can create health risks to utility workers by creating oxygen-deficient atmosphere. The threat of vapor-phase contamination in the on-site storm water drainage and sewer systems may be significant at this site, considering that a sewer line, located between MW-2 and MW-10, passes through an area of soil and free-product contamination. Seepage of contaminated ground water or free-phase gasoline into this system is also possible considering the reported depth of this sewer line, eight feet bgs, is at or below the water table in this area of the site.

4.0 CONCLUSIONS

Based on the results of the site investigation described above, GWV has concluded the following:

1. Gasoline has been released to the subsurface at the site.
2. Free-phase gasoline was discovered in an area encompassing approximately 700 square feet with an estimated total volume of about 1,000 gallons in the subsurface at the site.
3. Soils in the vicinity of the removed gasoline underground storage tanks (USTs) had elevated photoionization detector (PID) readings, and gasoline compounds were detected at levels above Vermont Ground Water Enforcement Standards (VGES) in ground water at the site.
4. Observations made during the UST closure, and the distribution of dissolved-phase contamination and free-phase gasoline suggest that the subsurface contamination is principally due to gasoline releases in the vicinity of the USTs and former pump island.
5. The lateral extent of dissolved-phase contamination and free-phase gasoline contamination appears to have been adequately determined.
6. Approximately 19.5 gallons of gasoline were removed from the wells by hand bailing, during eight site visits between 5 September and 24 October 1996. Product thickness in the wells have generally ranged from 0.1 to 2.3 feet, and has shown only a slight declining trend.
7. On 18 October 1996, GWV installed and began operating an automated product-recovery pump in monitoring well MW-2. As of 24 October 1996, the pumping system had recovered an estimated 2 gallons of gasoline.
8. Subsurface contamination at the site does not appear to pose a potential threat to indoor air quality of the adjacent buildings, due to the fact that all of the on-site buildings a constructed on concrete slab foundations.
9. Subsurface contamination at the site could pose a potential explosion hazard due to the possible accumulation of gasoline vapors in sewer lines and the storm water drainage system located within or adjacent to the contaminant plume. The locations of the utilities is poorly documented and the risks to these underground utilities have not been adequately evaluated to date.
10. No drinking-water supplies appear to be at risk from the contamination at the site.
11. Surficial materials at the site consist predominately of medium-to-fine sands with a trace amount of gravel. On 27 September 1996, the water table was found to be about 3 to 8 feet below ground surface, and exhibited a southwesterly trending gradient of about 2.3 percent. The representative range of ground-water flow velocities are expected to be between 0.03 and 0.6 feet per day.

5.0 RECOMMENDATIONS

On the basis of the results of this investigation and the conclusions stated above, Ground Water of Vermont recommends the following:

1. The site should be visited bi-weekly, to maintain and collect data on the performance of the product recovery system in MW-2, to measure water and product elevations in the on-site wells in and near the product plume, and to recover by hand bailing accumulated product in the other monitoring wells at the site.
2. All utility manholes and storm drains in the vicinity of the free-product and dissolved contamination plumes should be inspected and field-screened with a PID to evaluate whether gasoline vapors are accumulating. The locations of all underground utilities in the vicinity of the contaminant plume should be surveyed.
3. The on-site monitoring wells that do not contain free-product should be sampled and analyzed for BTEX compounds and MTBE by EPA Method 8020 on a quarterly basis beginning in November 1996.
4. Product recovery data, analytical results from the November ground-water monitoring event, and manhole/storm drain PID readings should be used to prepare an initial remedial progress report. The report should evaluate whether more aggressive remedial options should be considered at the site.

6.0 REFERENCES

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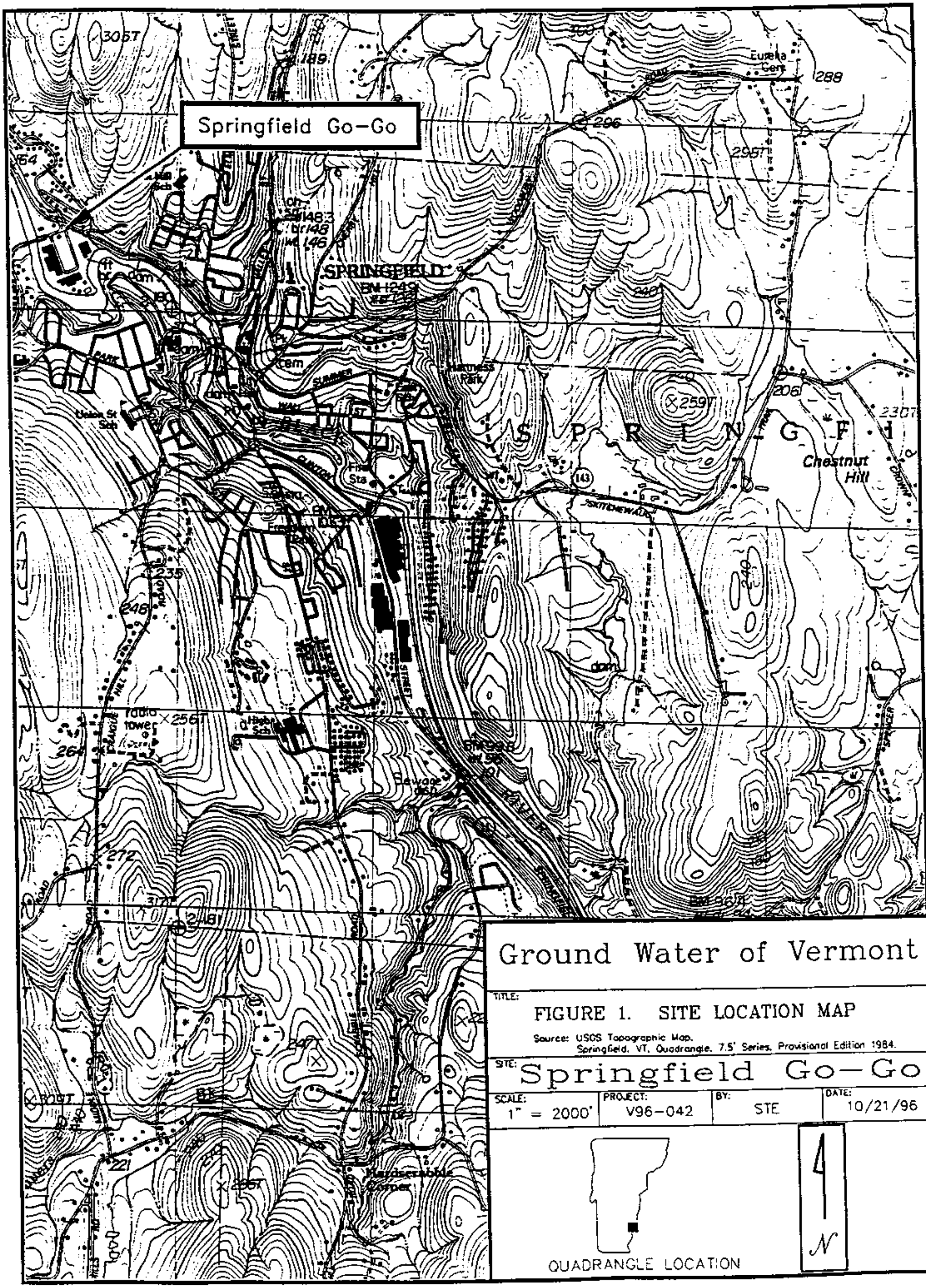
APPENDIX A

Figures and Tables



Ground Water of Vermont

TITLE:

FIGURE 1. SITE LOCATION MAP

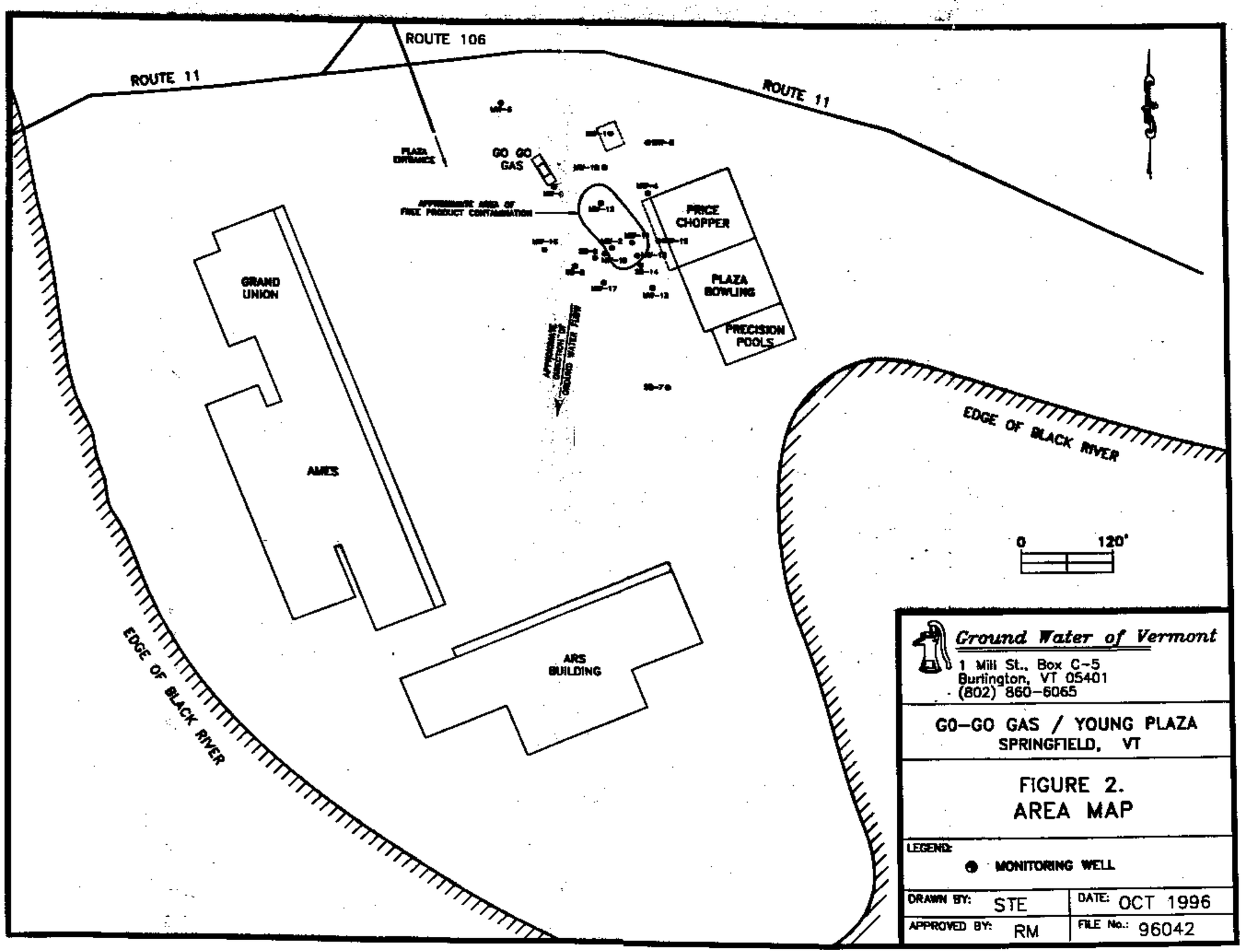
Source: USGS Topographic Map, Springfield, VT, Quadrangle, 7.5' Series, Provisional Edition 1984.

SITE: Springfield Go-Go

SCALE:	PROJECT:	BY:	DATE:
1" = 2000'	V96-042	STE	10/21/96

QUADRANGLE LOCATION

N



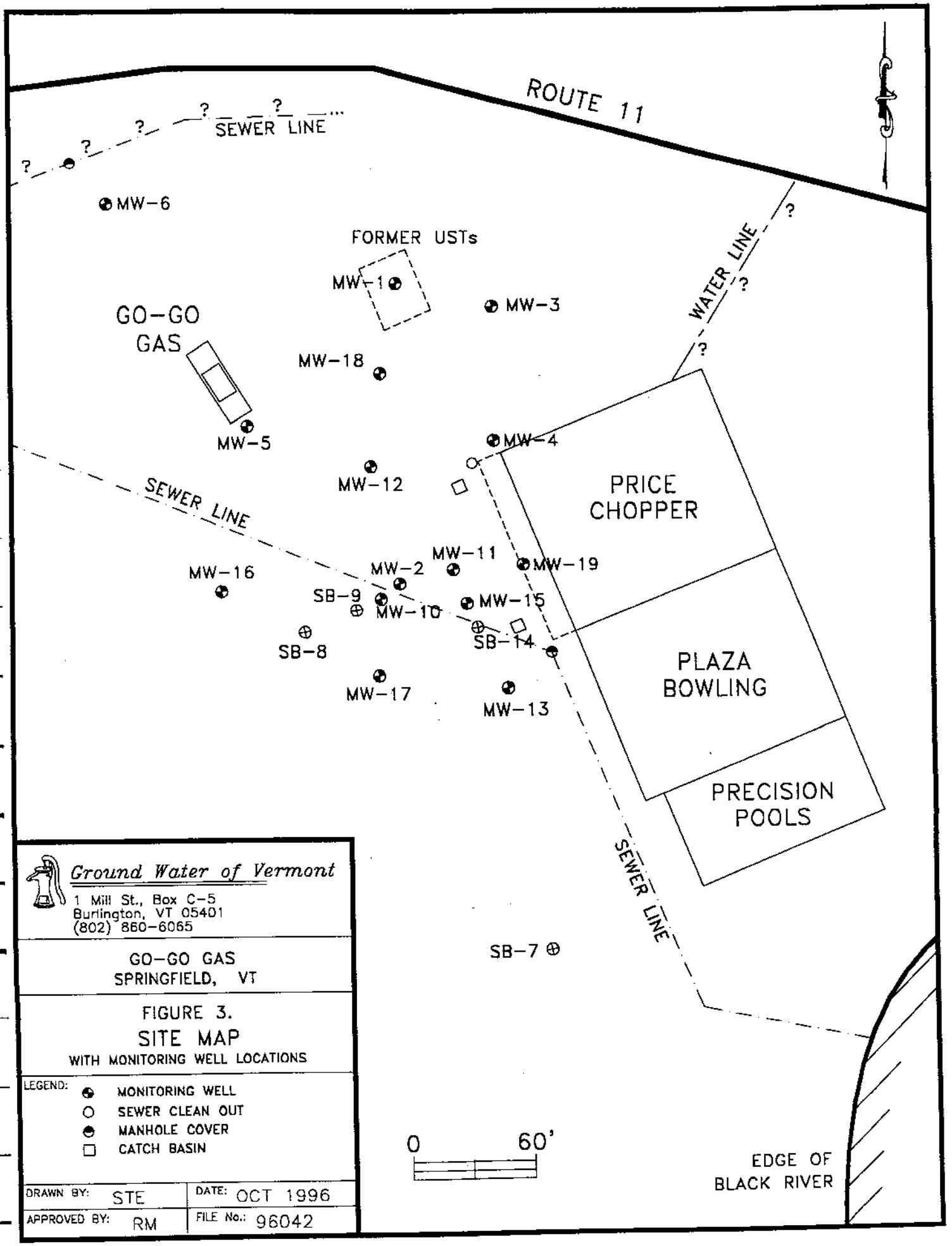
Ground Water of Vermont
1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

GO-GO GAS / YOUNG PLAZA
SPRINGFIELD, VT

FIGURE 2.
AREA MAP

LEGEND:
● MONITORING WELL

DRAWN BY: STE	DATE: OCT 1996
APPROVED BY: RM	FILE No.: 96042



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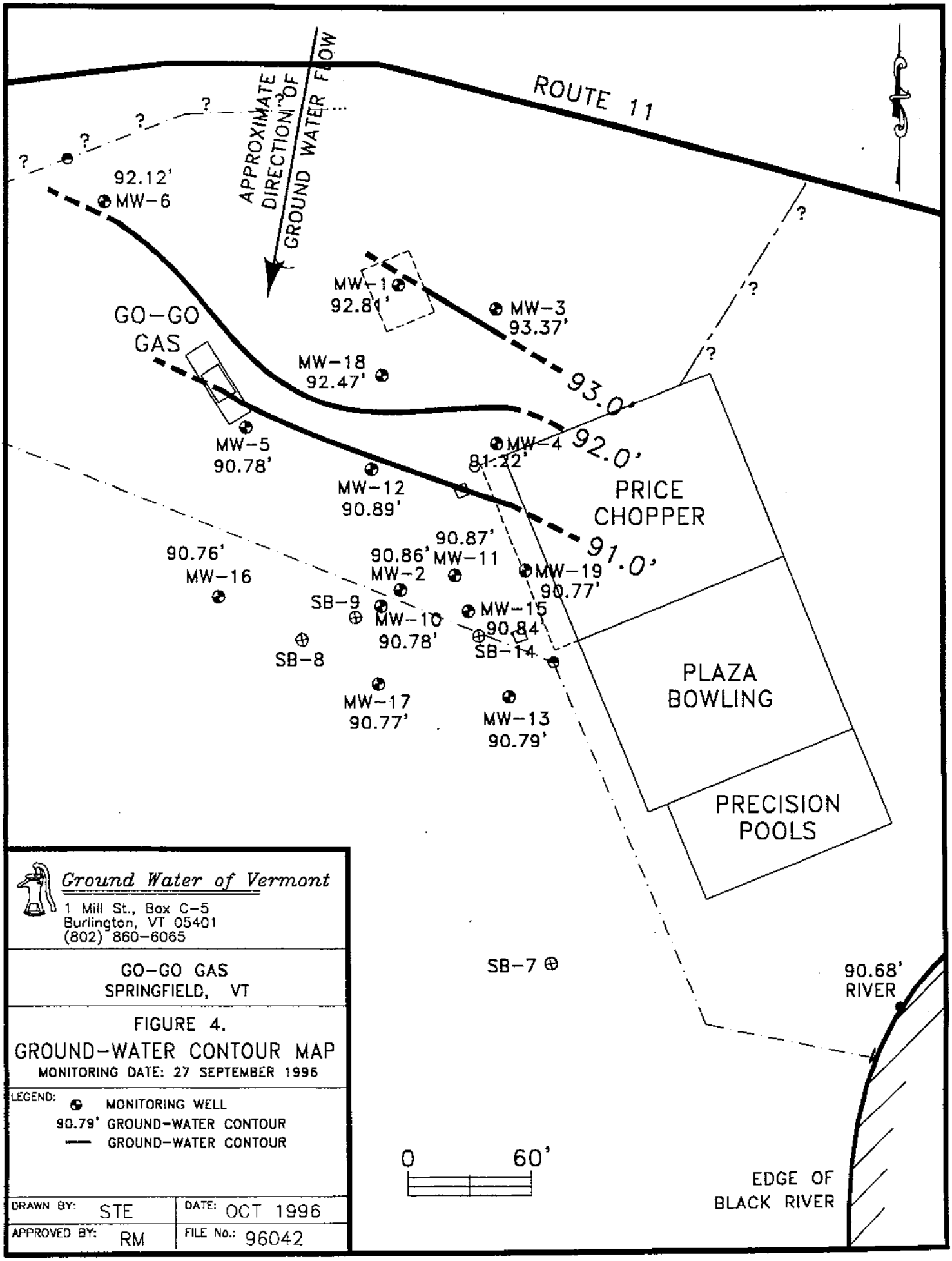
1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

GO-GO GAS
SPRINGFIELD, VT

FIGURE 3.
SITE MAP
WITH MONITORING WELL LOCATIONS

LEGEND:
- MONITORING WELL
- SEWER CLEAN OUT
- MANHOLE COVER
- CATCH BASIN

DRAWN BY: STE	DATE: OCT 1996
APPROVED BY: RM	FILE No.: 96042



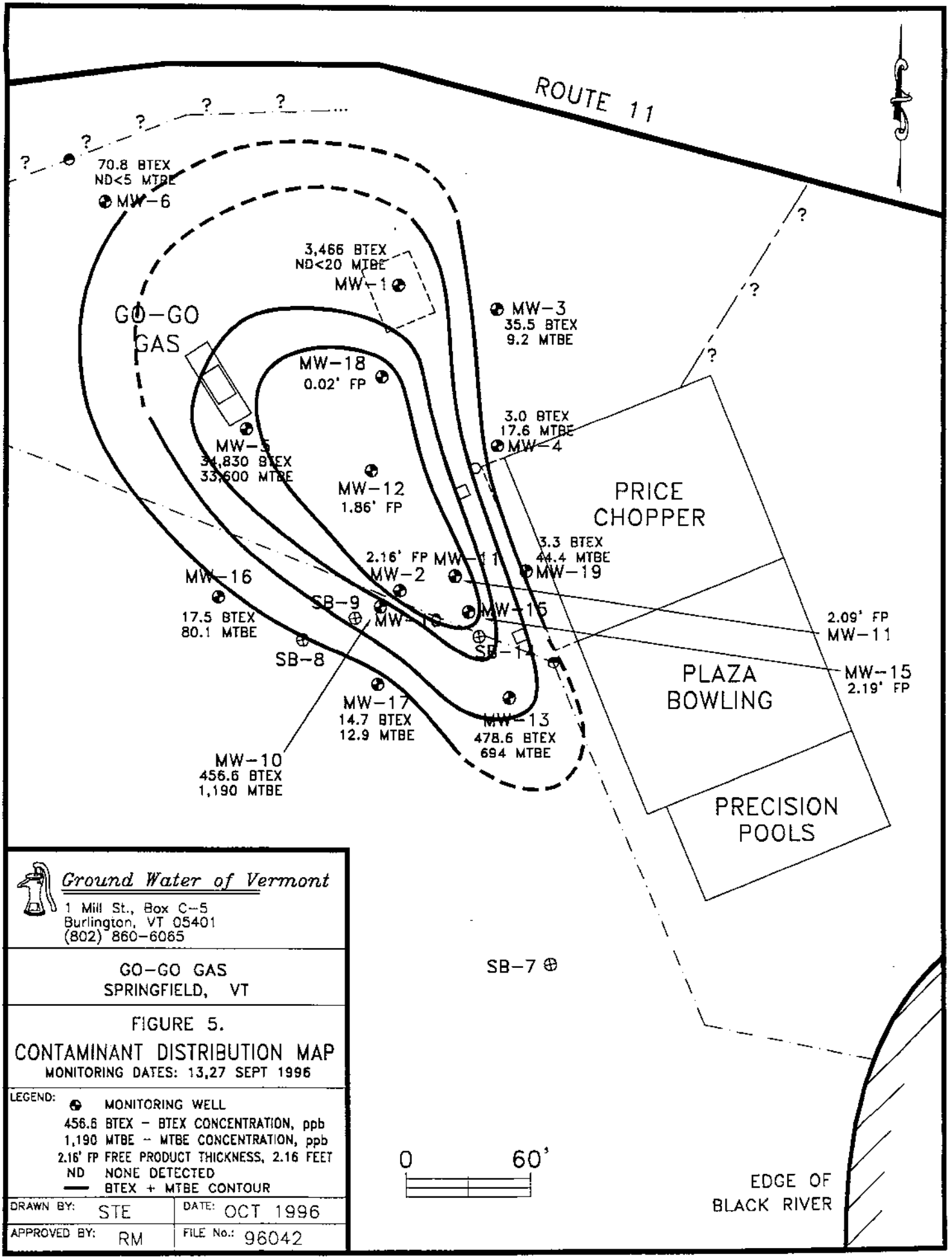
Ground Water of Vermont
1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

GO-GO GAS
SPRINGFIELD, VT

FIGURE 4.
GROUND-WATER CONTOUR MAP
MONITORING DATE: 27 SEPTEMBER 1996

LEGEND:
- MONITORING WELL
- 90.79' GROUND-WATER CONTOUR
- GROUND-WATER CONTOUR

DRAWN BY: STE	DATE: OCT 1996
APPROVED BY: RM	FILE No.: 96042



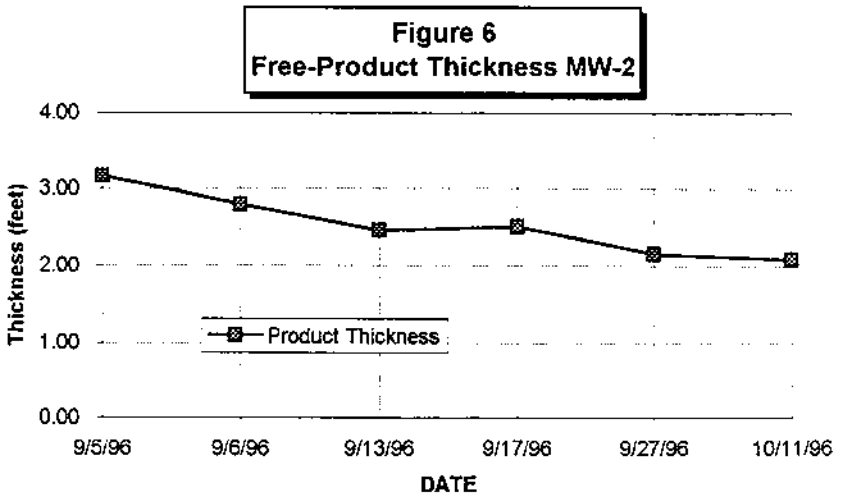
Ground Water of Vermont
1 Mill St., Box C-5
Burlington, VT 05401
(802) 860-6065

GO-GO GAS
SPRINGFIELD, VT

FIGURE 5.
CONTAMINANT DISTRIBUTION MAP
MONITORING DATES: 13,27 SEPT 1996

LEGEND:
- MONITORING WELL
- 456.6 BTEX – BTEX CONCENTRATION, ppb
- 1,190 MTBE – MTBE CONCENTRATION, ppb
- 2.16' FP FREE PRODUCT THICKNESS, 2.16 FEET
- ND NONE DETECTED
- BTEX + MTBE CONTOUR

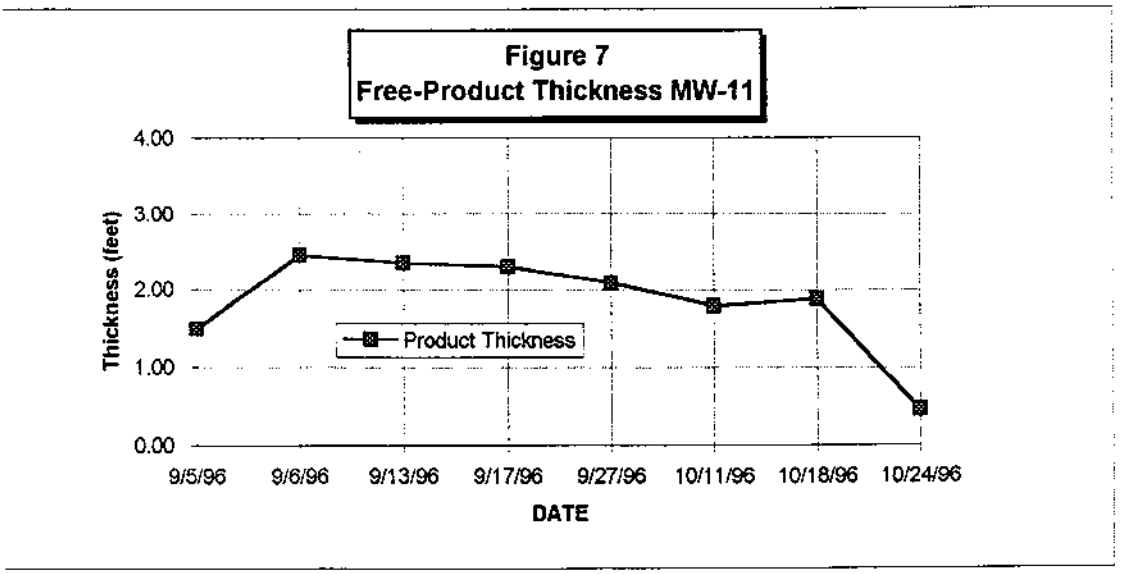
DRAWN BY: STE	DATE: OCT 1996
APPROVED BY: RM	FILE No.: 96042



Former Go-Go Gas
Springfield, Vermont
Monitoring Well - MW-2

Date	Depth to Product (feet, bgs)	Product Thickness (feet)	Depth to Water (feet, bgs)	Corrected Depth to Water (feet)	Ground Water Elevation	Volume Recovered (gallons)	Cumulative Volume Recovered
9/5/96	6.33	3.16	9.49	6.96	**90.58**	**2.25**	**2.25**
9/6/96	6.08	2.80	8.88	6.64	**90.90**	**1.98**	**4.23**
9/13/96	6.29	2.46	8.75	6.78	**90.76**	**1.08**	**5.31**
9/17/96	6.32	2.51	8.83	6.82	**90.72**	**1.03**	**6.34**
9/27/96	6.25	2.16	8.41	6.68	**90.86**	**0.71**	**7.05**
10/11/96	6.31	2.09	8.40	6.73	**90.81**	**0.55**	**7.61**

Free-product was removed twice from MW-2 on 5 and 6 September, once in the morning and once in the afternoon.
Top of Casing elevation for MW-2 is 97.54 feet, measured relative to an arbitrary site datum of 100.00 feet.
Spill terminator installed on 18 October 1996 to automatically recover free-product.

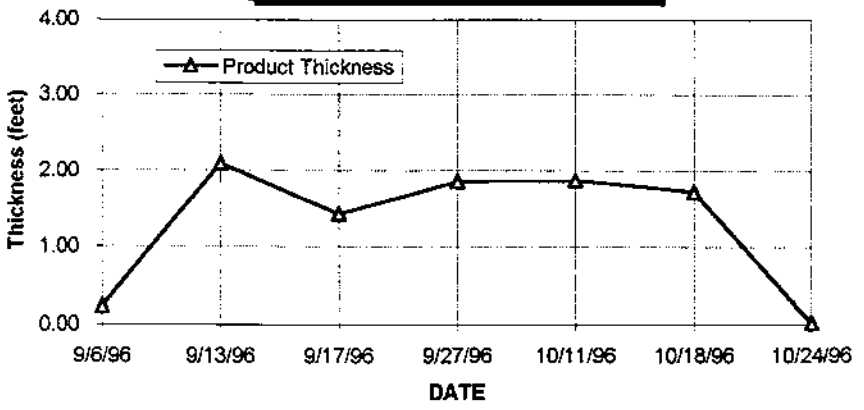


Former Go-Go Gas
Springfield, Vermont
Monitoring Well - MW-11

Date	Depth to Product (feet, bgs)	Product Thickness (feet)	Depth to Water (feet, bgs)	Corrected Depth to Water (feet)	Ground Water Elevation	Volume Recovered (gallons)	Cumulative Volume Recovered
9/5/96	---	1.50	—	---	—	0.53	0.53
9/6/96	5.65	2.45	8.10	6.14	90.77	1.19	1.72
9/13/96	5.68	2.35	8.03	6.15	90.76	1.24	2.96
9/17/96	5.77	2.30	8.07	6.23	90.68	0.85	3.80
9/27/96	5.62	2.09	7.71	6.04	90.87	0.66	4.46
10/11/96	5.82	1.79	7.61	6.18	90.73	0.61	5.07
10/18/96	5.63	1.88	7.51	6.01	90.90	0.50	5.57
10/24/96	5.97	0.46	6.43	6.06	90.85	0.11	5.68

Free-product was removed twice from MW-11 on 6 September, once in the morning and once in the afternoon.
Top of Casing elevation for MW-11 is 96.91 feet, measured relative to an arbitrary site datum of 100.00 feet.

Figure 8
Free-Product Thickness MW-12

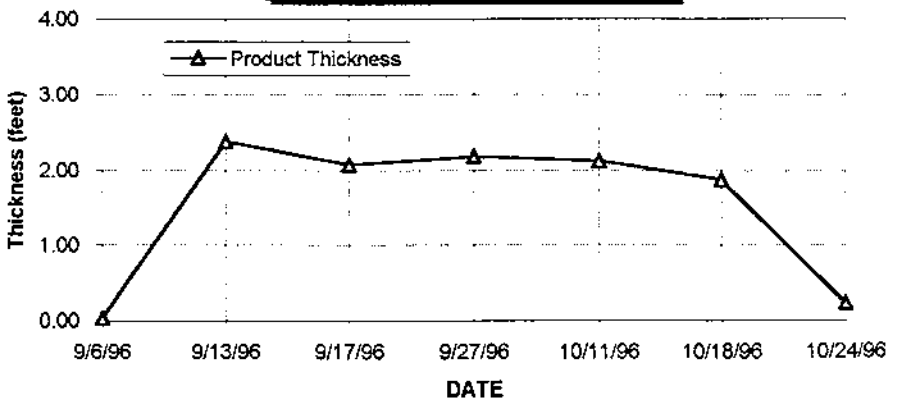


Former Go-Go Gas
Springfield, Vermont
Monitoring Well - MW-12

Date	Depth to Product (feet, bgs)	Product Thickness (feet)	Depth to Water (feet, bgs)	Corrected Depth to Water (feet)	Ground Water Elevation	Volume Recovered (gallons)	Cumulative Volume Recovered
9/6/96	7.10	0.24	7.34	7.15	89.78	0.11	0.11
9/13/96	5.71	2.09	7.80	6.13	90.80	0.66	0.77
9/17/96	6.34	1.43	7.77	6.63	90.30	0.79	1.56
9/27/96	5.67	1.86	7.53	6.04	90.89	0.55	2.11
10/11/96	5.69	1.87	7.56	6.06	90.87	0.53	2.64
10/18/96	5.53	1.73	7.26	5.88	91.05	0.45	3.09
10/24/96	5.05	0.02	5.07	5.05	91.88	0.00	3.09

Top of Casing elevation for MW-12 is 96.93 feet, measured relative to an arbitrary site datum of 100.00 feet.

Figure 9
Free-Product Thickness MW-15

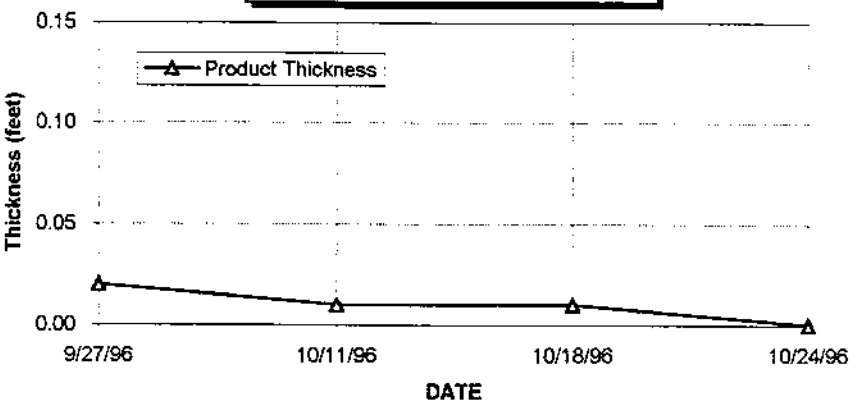


Former Go-Go Gas
Springfield, Vermont
Monitoring Well - MW-15

Date	Depth to Product (feet, bgs)	Product Thickness (feet)	Depth to Water (feet, bgs)	Corrected Depth to Water (feet)	Ground Water Elevation	Volume Recovered (gallons)	Cumulative Volume Recovered
9/6/96	6.11	0.03	6.14	6.12	90.65	0.00	0.00
9/13/96	5.56	2.39	7.95	6.04	90.73	0.79	0.79
9/17/96	5.72	2.08	7.80	6.14	90.63	0.77	1.56
9/27/96	5.49	2.19	7.68	5.93	90.84	0.53	2.09
10/11/96	5.56	2.13	7.69	5.99	90.78	0.58	2.67
10/18/96	5.51	1.88	7.39	5.89	90.88	0.40	3.06
10/24/96	5.04	0.23	5.27	5.09	91.68	0.04	3.10

Top of Casing elevation for MW-15 is 96.77 feet, measured relative to an arbitrary site datum of 100.00 feet.

Figure 10
Free-Product Thickness MW-18

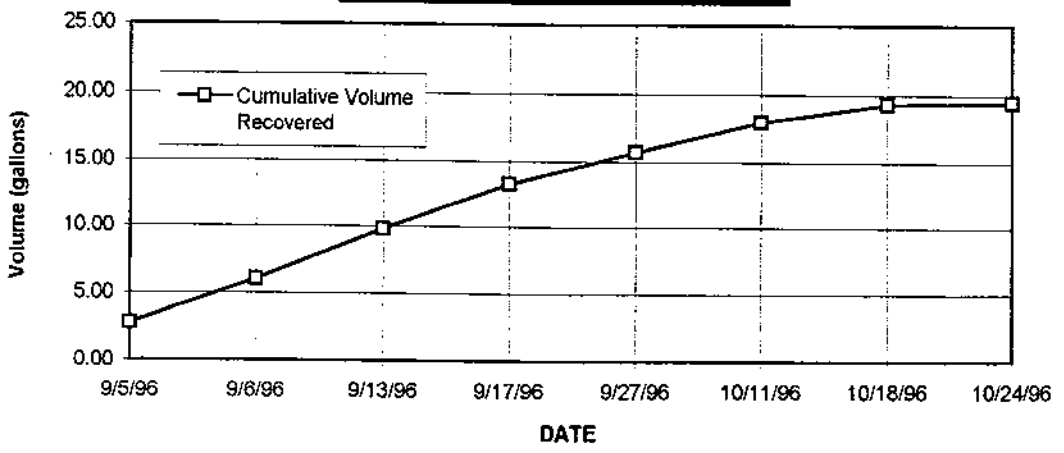


Former Go-Go Gas
Springfield, Vermont
Monitoring Well - MW-18

Date	Depth to Product (feet, bgs)	Product Thickness (feet)	Depth to Water (feet, bgs)	Corrected Depth to Water (feet)	Ground Water Elevation	Volume Recovered (gallons)	Cumulative Volume Recovered
9/27/96	3.84	0.02	3.86	3.84	**92.47**	**0.00**	**0.00**
10/11/96	3.64	0.01	3.65	3.64	**92.67**	**0.00**	**0.00**
10/18/96	3.53	0.01	3.54	3.53	**92.78**	**0.00**	**0.00**
10/24/96	0.00	0.00	3.00	3.00	**93.31**	**0.00**	**0.00**

Top of Casing elevation for MW-18 is 96.31 feet, measured relative to an arbitrary site datum of 100.00 feet.

Figure 11
Cumulative Volume of Gasoline Recovered by Hand Bailing



Gasoline Recovery Calculations
Former Go-Go Gas
Springfield, Vermont

Date	MW-2	MW-11	MW-12	MW-15	Volume Recovered Each Day (gallons)	Cumulative Volume Recovered
9/5/96	2.25	0.53	--	--	2.77	2.77
9/6/96	1.98	1.19	0.11	--	3.28	6.05
9/13/96	1.08	1.24	0.66	0.79	3.78	9.83
9/17/96	1.03	0.85	0.79	0.77	3.43	13.26
9/27/96	0.71	0.66	0.55	0.53	2.46	15.72
10/11/96	0.55	0.61	0.53	0.58	2.27	17.99
10/18/96	0.00	0.50	0.45	0.40	1.35	19.34
10/24/96	0.00	0.11	0.00	0.04	0.15	19.48

MW-2 installed on 8/29/96, approximately 1' of free-product present but not removed from well.
MW-11, MW-12, and MW-15 installed on 9/5/96.
MW-18 installed on 9/17/96, no free-product has been recovered from this well.
Spill terminator installed in MW-2 on 18 October 1996 to automatically recover free-product.

TABLE 1. GROUND-WATER ELEVATION CALCULATIONS

Springfield GoGo
Springfield Shopping Plaza
Springfield, VT

Monitoring Date: 27 September 1996

Well I.D.	Top of Casing Elevation	Depth to Product (feet, TOC)	Depth to Water (feet, TOC)	Product Thickness (feet)	Corrected Depth to water	Water Table Elevation
MW-1	97.78	-	4.97	--	-	92.81
MW-2	97.54	6.25	8.41	2.16	6.68	90.86
MW-3	95.82	-	2.45	--	-	93.37
MW-4	97.11	-	5.89	--	-	91.22
MW-5	98.41	-	7.63	--	-	90.78
MW-6	100.00	-	7.88	--	-	92.12
MW-10	97.82	-	7.04	--	-	90.78
MW-11	96.91	5.62	7.71	2.09	6.04	90.87
MW-12	96.93	5.67	7.53	1.86	6.04	90.89
MW-13	96.94	-	6.15	--	-	90.79
MW-15	96.77	5.49	7.68	2.19	5.93	90.84
MW-16	98.62	-	7.86	--	-	90.76
MW-17	97.99	-	7.22	--	-	90.77
MW-18	96.31	3.84	3.86	0.02	3.84	92.47
MW-19	97.53	-	6.76	--	-	90.77

All values reported in feet relative to an arbitrary 100' datum.

TABLE 2
Analytical Results
Go Go Gas
Springfield, Vermont

Well I.D.	Date	Benzene	Toluene	Ethyl benzene	Xylenes	Total BTEX	MTBE
MW-1	09/13/96	**2,640**	**124**	**202**	**500**	**3,466**	ND < 20
MW-3	09/13/96	**14.6**	**7.7**	**13.2**	TBQ <1	**35.5**	**9.2**
MW-4	09/13/96	**1.9**	**1.1**	ND <1	ND <1	**3.0**	**17.6**
MW-5	09/13/96	**14,100**	**4,710**	**2,720**	**13,300**	**34,830**	**33,600**
MW-5 Dup	09/13/96	**16,300**	**5,040**	**3,110**	**15,100**	**39,550**	**37,300**
MW-6	09/13/96	**7.4**	**42.3**	**8.9**	**12.2**	**70.8**	ND <5
MW-10	09/13/96	**417**	**27.3**	ND <10	**12.3**	**456.6**	**1,190**
MW-13	09/13/96	**443.0**	**35.6**	ND <20	TBQ<20	**478.6**	**694**
Trip Blank	09/13/96	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1
MW-16	09/27/96	ND <1	ND <1	**17.5**	ND <1	**17.5**	**80.1**
MW-17	09/27/96	ND <1	ND <1	**14.7**	ND <1	**14.7**	**12.9**
MW-19	09/27/96	TBQ <1	ND <1	**3.3**	ND <1	**3.3**	**44.4**
MW-19 Dup	09/27/96	TBQ <1	ND <1	**3.4**	ND <1	**3.4**	**47.8**
Trip Blank	09/27/96	ND <1	ND <1	ND <1	ND <1	ND <1	ND <1
VGES		5	2,420	680	400	—	40

Notes:
Results given in parts per billion (ppb).
ND - None detected at indicated detection limit.
TBQ - Trace below quantitation limit indicated.
All samples collected by GWV and analyzed by Endyne, Inc.
VGES - Vermont Groundwater Enforcement Standards

APPENDIX B

Soil Boring and Well Construction Logs

Ground Water of Vermont

FIELD SUPERVISOR Brian Stever
CONTRACTOR Gurney Brothers Earth Movers
DRILLERS Gurney Brothers

JOB LOCATION Go Go Gas
DATE 7/25/96

DRILLING METHOD installed w/ excavator
BORING DIAMETER 4ST excavation

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # MW-1
TOTAL DEPTH 12'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" (0/6, 6/12, 12/18, 18/24)	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Reading in parts per million (ppm) GENERAL DESCRIPTION	WELL DETAIL	DEPTH
					topsoil		0-1' - 80.6 ppm Strong gasoline odor	riser 6"	
					Poorly sorted brown sand and gravel ↓		1-5' - 124 ppm ~ water table, petroleum sheen		5'
					fine light brown sand ↓		damp	screen	
							6' - 376 ppm damp	medium brown sand	10'
					Bottom of Excavation				
15'									15'
20'									20'
25'									25'
30'									30'
35'									35'
40'									40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	0.20"/2" PVC	10'	GROUT	yes	
SLOT SIZE	0.20"/2" PVC	10'	BACKFILL	no	
RISER PIPE	2" PVC	2'	WATER USED	no	
GRADED SAND	med sand		STEAM CLEANER	no	
PELLET BENTONITE	no				
GRANULAR BENTONITE	no				

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION 60 60 gas
DATE 8/28/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION
sketch on back or on-site plan with measurements

BORING # MW-2
TOTAL DEPTH 12.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Reading In GENERAL DESCRIPTION Parts per million (ppm)	WELL DETAIL	DEPTH
							2.0	pavement		0-5 - 219 ppm fill		
								poorly sorted brown sand + gravel				
								fine brown sand		gasoline odor - strong		
5'							4.5	↓		5-10' - 341 ppm		5'
										~ water table and weathered free product		
								fine gray-brown sand and silt		- soils gray from weathered product		
10'							3.0	↓		10-13 - 362 ppm Strong odor		10'
								Bottom of Boring		well not developed due to free product		
15'												15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

WELL DETAIL: riser, screen, sand, native

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10"	PVC 10'
RISER PIPE	2" PVC	2.2'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	½ gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 8/28/96

DRILLING METHOD Vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION
sketch on back or on-site plan with measurements

BORING # MW-3
TOTAL DEPTH 10.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" (0/6, 6/12, 12/18, 18/24)	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm) GENERAL DESCRIPTION	WELL DETAIL
				5.0	pavement. Black medium to fine sand - Foundry fill		0-5' 26.4 ppm - fill from foundries	
5'				4.0	Poorly sorted brown sand and gravel ↓		weathered gasoline odor - ∿ water table + sheens 5-10 - 87.4 ppm	
10'				1.0	dark gray silt and a trace of fine sand ↓		Strong gasoline odor + sheens 10-11' - 36.2 ppm	
					refusal from wood debris			

WELL DETAIL: riser, Screen, Sand

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10"/PVC	10'
RISER PIPE	2" PVC	3'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	¼ gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	no	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 8/28/96

DRILLING METHOD Vibratory
BORING DIAMETER 2.375"

AND	40 – 50%
SOME	10 – 40%
TRACE	0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # MW-4
TOTAL DEPTH 12.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	GENERAL DESCRIPTION (PID Readings in parts per million (ppm))	WELL DETAIL	DEPTH
							4.5'	pavement; poorly sorted light brown sand and gravel		0-5' - 33.6; dry	riser; native	
								medium to fine Black Sand - foundry fill		gasoline odor		
5'							5.0	↓		5-6' - 13.2 ppm; ~ Water Table; 6-9 - 0.4 ppm		5'
								medium to fine gray-brown sand ↓			screen; sand	
10'							4.5	fine dark gray silt ↓		9-10' - 0.3 ppm; damp, 10-11 - 0.0 ppm		10'
								medium to fine gray-brown sand		11-13 - 0.4 ppm; damp		
								Bottom of Boring				
15'												15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10"/PVC	10'
RISER PIPE	2" PVC	2.3'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	1/2 gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Stoer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 8/28/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements

BORING # MW-5
TOTAL DEPTH 14.8'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm) GENERAL DESCRIPTION
							5.0	pavement poorly sorted light brown sand and gravel		0-5' - 101 ppm strong gasoline odor
								fine light brown sand		dry
5'							5.0			5-10' - 209 ppm
								medium to fine light brown sand with a trace of gravel		~ Water Table
10'							5.0			strong gasoline odor 10-15' - 217 ppm
										damp
15'								Bottom of Boring		
20'										
25'										
30'										
35'										
40'										

WELL DETAIL: Flush mount; Riser; Screen; Sand; DEPTH: 5', 10', 15', 20', 25', 30', 35', 40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	0.10 / 2" PVC	10'	GROUT		
SLOT SIZE	0.10 / 2" PVC	10'	BACKFILL		
RISER PIPE	2" PVC	2.5"	WATER USED		
GRADED SAND			STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE					

Ground Water of Vermont

FIELD SUPERVISOR Brian Starer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # mw-6
TOTAL DEPTH 14.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in Parts per million (ppm) GENERAL DESCRIPTION	WELL DETAIL	DEPTH
							30	medium to fine light brown sand and gravel ↓		loose fill material 0-5' - 0.6ppm dry	riser / native	
5'							25	orange-brown cinder or foundry slag type material ↓		odor, but not like gasoline 5-10' - 0.3ppm ~ WT	screen / sand	5'
10'							4.0	fine gray sand ↓		wet, odor, but not gasoline 10-15 - 1.2ppm		10'
15'												15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	0.16/2" PVC	10'	GROUT	yes	
SLOT SIZE	0.10/PVC	10'	BACKFILL	yes	
RISER PIPE	2" PVC	4.2'	WATER USED	no	
GRADED SAND	#1	1-2 gallons	STEAM CLEANER	yes	
PELLET BENTONITE					
GRANULAR BENTONITE	1/2" pcs	1/2 gallon			

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Jerry Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION 60 Go Gas
DATE 9/5/96

DRILLING METHOD Vibratory
BORING DIAMETER 2.375 2.375

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # SB-7
TOTAL DEPTH 13'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in Parts per million (ppm) GENERAL DESCRIPTION	WELL DETAIL	DEPTH
							0	Poorly Sorted brown sand and gravel		Pushed a rock Orecovery no odor		
5'							4.0	fine brown sand		5-7' - 0.5 ppm ~WTable, no odor 7-10' - 0.6 ppm		5'
								fine gray silt and sand				
10'							13.0			10-13 - 0.6ppm no odor		10'
15'								Bottom of Boring				15'
20'										Note Well removed, too far downgradient		20'
25'												25'
30'												30'
35'												35'
40'												40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'	GROUT	yes	
SLOT SIZE	0.10	10'	BACKFILL	yes	
RISER PIPE	2" PVC	2.5'	WATER USED	no	
GRADED SAND	#1	1 gallon	STEAM CLEANER	yes	
PELLET BENTONITE					
GRANULAR BENTONITE	yes	1/2 gallon			

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on site plan with measurements

BORING # SB-8

TOTAL DEPTH 10'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in Parts Per million (ppm) GENERAL DESCRIPTION	WELL DETAIL	DEPTH
							5.0	poorly sorted brown sand + gravel		0-5' - 0.0 ppm no odors		
								light brown fine sand with a trace of silt				
5'							4.0			∇ water Table no odors or sheens		5'
										5-10' - 0.8 ppm		
10'												10'
										Note: Stopped at 10' PID readings were at background - Did not set well		
15'												15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN			GROUT		
SLOT SIZE			BACKFILL		
RISER PIPE			WATER USED		
GRADED SAND			STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE					

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # SB-9
TOTAL DEPTH 10'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in Parts Per million (ppm) GENERAL DESCRIPTION	WELL DETAIL	DEPTH
							4.0	poorly sorted brown sand and gravel		0-5' - 0.0 ppm dry no odors		
								fine brown sand		dry		
5'							5.0			~ water table no sheens or odors 5-10' - 0 or 2 ppm		5'
10'												10'
										Note: No well set, PID readings at background		
15'												15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN			GROUT		
SLOT SIZE			BACKFILL		
RISER PIPE			WATER USED		
GRADED SAND			STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE					

Ground Water of Vermont

FIELD SUPERVISOR Brian Stever
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on site plan with measurements
BORING # MW-10
TOTAL DEPTH 13.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	P.I.D Readings in GENERAL DESCRIPTION Parts Per million (ppm)	WELL DETAIL	DEPTH
							4.0	Pavement poorly sorted brown sand and gravel		0-5' - 50.1 ppm dry gasoline odor		
								fine brown sand		dry		
5'							4.0			5-10' - 46.2 ppm N Water Table slight gas odor 10-12' - 39.4 ppm		5'
										weathered gasoline odor no sheens		
10'							4.5					10'
								fine gray sand and silt		12-13.5 - 26.2 ppm		
15'								medium gray-brown sand		13.5-15' - 19.6 ppm		15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

WELL DETAIL: RISER, native soil, SCREEN, SAND

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'	GROUT	yes	
SLOT SIZE	0.10 PVC	10'	BACKFILL	no	
RISER PIPE	2" PVC	3.2'	WATER USED	no	
GRADED SAND	#1	1 gallon	STEAM CLEANER	yes	
PELLET BENTONITE					
GRANULAR BENTONITE	granular	1/2 gallon			

Ground Water of Vermont

FIELD SUPERVISOR Brian Steer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/5/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # MW-11
TOTAL DEPTH 13'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in GENERAL DESCRIPTION parts per million (ppm)
							4.0	Poorly sorted brown sand and gravel		0-5' - 190 ppm very strong gasoline odor dry
5'							4.0	fine brown sand		5-10' - 260 ppm ~ water Table and Free Product
10'							5.0	gray silt and fine sand		10-10.5' - 274 ppm 10.5-13.1' - 334 ppm
15'								course sand and gravel		13-15' - 344 ppm
20'										
25'										
30'										
35'										
40'										

WELL DETAIL: RISER, SCREEN, SAND

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10"/PVC	10'
RISER PIPE	2" PVC	2.7'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	1/2 gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE ~~10~~ 9/6/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION
sketch on back or on-site plan with measurements

BORING # MW-12
TOTAL DEPTH 13.0'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in parts per million (ppm) GENERAL DESCRIPTION
							4.0	~~Bedrock~~ poorly sorted brown sand and gravel		0-5' - 243ppm dry strong gasoline odor
5'							4.8	fine dark brown sand		5-10' - 264 ppm - no water Table + Free Product petroleum stained soils
10'							5.0	coarse gray-brown sand		10-12.5' - 234 ppm
										12.5-15.0 - 246 ppm

WELL DETAIL: RISER, SCREEN, SAND, Pack

DEPTH: 5', 10', 15', 20', 25', 30', 35', 40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2"/PVC	10'	GROUT	yes	
SLOT SIZE	0.10" PVC	10'	BACKFILL	yes	
RISER PIPE	2" PVC	2.7'	WATER USED	no	
GRADED SAND	#1	1 gallon	STEAM CLEANER	yes	
PELLET BENTONITE					
GRANULAR BENTONITE	yes	1/2 gallon			

Ground Water of Vermont

FIELD SUPERVISOR	Brian Storer
CONTRACTOR	Adams Engineering
DRILLERS	Jerry Adams
JOB LOCATION	Go Go Gas
DATE	9/6/16
DRILLING METHOD	vibratory
BORING DIAMETER	2.375"
BORING LOCATION	sketch on back or on-site plan with measurements
BORING #	MW-13
TOTAL DEPTH	13.5

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in GENERAL DESCRIPTION parts per million (ppm)	WELL DETAIL	DEPTH
							4.0	pavement poorly sorted brown sand and gravel ↓		0-5' - 0.1 ppm dry no odor	RISER / native fill	
5'							5.0	fine gray-brown sand with a trace of silt ↓		~ water table 5-10' - 0.2 ppm thin organic layer	SCREEN / SAND	5'
10'							5.0	fine gray-brown sand with a trace of silt ↓		10-13.5 - 3.1 ppm no odors or sheens 13.5-14.5 - 2.2 ppm	SCREEN / SAND	10'
15'								coarse gray-brown sand				15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.010 PVC	10'
RISER PIPE	2" PVC	3.3'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	1/2 gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go 60 Gas
DATE 9/6/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # SB-14
TOTAL DEPTH 10'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in GENERAL DESCRIPTION Parts per million (ppm)	WELL DETAIL	DEPTH
							4.0	poorly sorted brown sand and gravel		0-5' - 18.6 ppm slight gasoline odor		
5'							5.0	fine brown sand with a trace of silt		- N water table no sheens or free product 5-10' - 11.2 ppm gasoline odor		5'
10'										Note: no well set due to the lack of free product.		10'
15'												15'
20'												20'
25'												25'
30'												30'
35'												35'
40'												40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN			GROUT		
SLOT SIZE			BACKFILL		
RISER PIPE			WATER USED		
GRADED SAND			STEAM CLEANER		
PELLET BENTONITE					
GRANULAR BENTONITE					

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/6/96

DRILLING METHOD Vibratory
BORING DIAMETER 2.375"

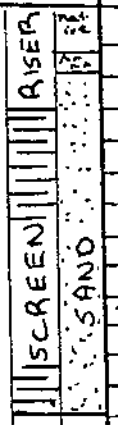
AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements

BORING # MW-15
TOTAL DEPTH 13'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in Parts per million (ppm) GENERAL DESCRIPTION
							5.0	pavement poorly sorted brown sand and gravel		0-5' - 228 ppm strong gasoline odor dry
5'							5.0	fine brown sand with a trace of silt		5-10' - 156 ppm - N Water Table and Free Product wet
10'							5.0	fine gray sand and silt		10-14' - 134 ppm wet
15'								coarse gray-brown sand		14.5' - 146 ppm
20'										
25'										
30'										
35'										
40'										

WELL DETAIL



DEPTH: 5', 10', 15', 20', 25', 30', 35', 40'

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10" PVC	10'
RISER PIPE	2" PVC	2.7'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	1/2 gallon	1/2 gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Sterer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/17/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # MW-16
TOTAL DEPTH 14'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" (0/6, 6/12, 12/18, 18/24)	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Reading in Parts per million (ppm) GENERAL DESCRIPTION	WELL DETAIL	DEPTH
				4.0	pavement poorly sorted brown sand and gravel		0.35 - 0.1ppm dry - no gasoline odors		
5'				3.5	fine gray - brown sand and silt		dump 3.5-5' - 0.0ppm dump 5-10' - 0.0ppm ~ water table no odors or sheens		5'
10'				5.0	coarse gray - brown sand		10-11.5' - 0.0ppm no gasoline odors 11.5-15' 0.0ppm	RISER SCREEN SAND natural	10'
15'									15'
20'									20'
25'									25'
30'									30'
35'									35'
40'									40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'	GROUT	yes	
SLOT SIZE	0.10" PVC	10'	BACKFILL	yes	
RISER PIPE	2" PVC	3.7'	WATER USED	no	
GRADED SAND	#1	1 gallon	STEAM CLEANER	yes	
PELLET BENTONITE					
GRANULAR BENTONITE	yes	1/2 gallon			

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION Go Go Gas
DATE 9/17/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # MW-17
TOTAL DEPTH 13.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in GENERAL DESCRIPTION parts per million (ppm)	WELL DETAIL
							3.9	pavement poorly sorted brown sand and gravel		0-2' – 0.0 ppm dry – no gasoline odors	
								medium brown sand ↓		2-5' – 0.0ppm damp	
5'							5.0			5-6.5' – 0.0ppm ~ water Table no odors or sheen	
								fine gray-brown sand and silt ↓		6.5'-10' – 0.0ppm wet – no odors	
10'							4.5			10-12' – 0.0ppm	
								course gray-brown sand ↓		12-14.5' – 0.0ppm wet no odors	
15'											
20'											
25'											
30'											
35'											
40'											

WELL DETAIL: NONE; RISER; SCREEN; SAND

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10" PVC	10'
RISER PIPE	2" PVC	3.2'
GRADED SAND	#1	1 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	½ gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	yes	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Storer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION 60 60 Gas
DATE 9/17/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION sketch on back or on-site plan with measurements
BORING # MW-18
TOTAL DEPTH 11.5'

DEPTH	SAMPLES	SAMPLE NUMBER	BLOWS PER 6" 0/6	6/12	12/18	18/24	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in Parts Per million (ppm) GENERAL DESCRIPTION	WELL DETAIL
							4.0	pavement Poorly sorted gray-brown sand and gravel		0-3' – 202ppm strong gasoline odor ~ Water Table and Free Product	
5'							3.5	Black Foundry Slag		3-5' – 243ppm 5-10 – 377ppm strong gasoline odor wet	
10'							2.0			10-11' – 364 ppm	
								fine gray-black sand and silt		11-13 – 339 ppm wet	
15'											
20'											
25'											
30'											
35'											
40'											

WELL DETAIL: RISER, SCREEN, SAND

MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'
SLOT SIZE	0.10" PVC	10'
RISER PIPE	2" PVC	1.3'
GRADED SAND	#1	1/2 gallon
PELLET BENTONITE		
GRANULAR BENTONITE	yes	1/2 gallon

MATERIALS USED	SIZE/TYPE	QUANTITY
GROUT	yes	
BACKFILL	no	
WATER USED	no	
STEAM CLEANER	yes	

Ground Water of Vermont

FIELD SUPERVISOR Brian Sterer
CONTRACTOR Adams Engineering
DRILLERS Jerry Adams

JOB LOCATION 6060 6as
DATE 9/17/96

DRILLING METHOD vibratory
BORING DIAMETER 2.375"

AND 40 – 50%
SOME 10 – 40%
TRACE 0 – 10%

BORING LOCATION
sketch on back or on-site plan with measurements

BORING # MW-19
TOTAL DEPTH 13'

DEPTH	SAMPLES SAMPLE NUMBER	BLOWS PER 6" (0/6, 6/12, 12/18, 18/24)	REC.	SAMPLE DESCRIPTION	STRAT CHG	PID Readings in GENERAL DESCRIPTION parts per million (ppm)	WELL DETAIL	DEPTH
			4.0	Concrete poorly sorted brown sand and gravel		0.5-4.5 - 0.2 ppm dry no odors or sheens	RISER, MINE, SCREEN, SAND	
						4.5-5.0 - 3.4 ppm		
5'			5.0	fine gray-brown sand and silt		5-10' - 6.2 ppm ~ water Table no odors or sheens		5'
						wet		
10'			2.0			10-13' - 0.7 ppm		10'
						wet - no odors or sheens		
				Course brown sand		13-14' - 0.0 ppm		
15'								15'
20'								20'
25'								25'
30'								30'
35'								35'
40'								40'

MATERIALS USED	SIZE/TYPE	QUANTITY	MATERIALS USED	SIZE/TYPE	QUANTITY
WELL SCREEN	2" PVC	10'	GROUT	yes	
SLOT SIZE	0.10" PVC	10'	BACKFILL	yes	
RISER PIPE	2" PVC	2.7'	WATER USED	no	
GRADED SAND	#1	1 gallon	STEAM CLEANER	yes	
PELLET BENTONITE					
GRANULAR BENTONITE	yes	½ gallon			

APPENDIX C

Laboratory Report Forms

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: GroundWater of Vermont
PROJECT NAME: Go Go Gas
REPORT DATE: September 19, 1996
DATE SAMPLED: September 13, 1996

PROJECT CODE: GWVT1153
REF.#: 93,820 - 93,828

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

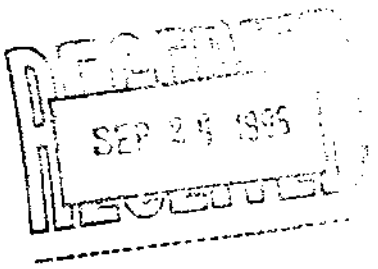
All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director



enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: Go Go Gas
CLIENT PROJ. #: V96-042

DATE RECEIVED: September 17, 1996
REPORT DATE: September 19, 1996
PROJECT CODE: GWVT1153

Ref. #:	93,820	93,821	93,822	93,823	93,824
Site:	Trip Blank	Duplicate	MW-1	MW-3	MW-4
Date Sampled:	9/13/96	9/13/96	9/13/96	9/13/96	9/13/96
Time Sampled:	7:05	NI	8:10	8:30	7:50
Sampler:	Brian Starer	Brian Starer	Brian Starer	Brian Starer	Brian Starer
Date Analyzed:	9/17/96	9/18/96	9/18/96	9/18/96	9/18/96
UIP Count:	0	>10	>10	>10	10
Dil. Factor (%):	100	0.2	5	100	100
Surr % Rec. (%):	88	92	100	85	90
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)
Benzene	<1	16,300.	2,640.	14.6	1.9
Chlorobenzene	<1	<500	<20	<1	<1
1,2-Dichlorobenzene	<1	<500	<20	<1	<1
1,3-Dichlorobenzene	<1	<500	<20	<1	<1
1,4-Dichlorobenzene	<1	<500	<20	<1	<1
Ethylbenzene	<1	3,110.	202.	TBQ <1	<1
Toluene	<1	5,040.	124.	7.7	1.1
Xylenes	<1	15,100.	500.	13.2	<1
MTBE	<1	37,300.	<20	9.2	17.6

Ref. #:	93,825	93,826	93,827	93,828	
Site:	MW-5	MW-6	MW-10	MW-13	
Date Sampled:	9/13/96	9/13/96	9/13/96	9/13/96	
Time Sampled:	9:15	7:30	8:45	9:00	
Sampler:	Brian Starer	Brian Starer	Brian Starer	Brian Starer	
Date Analyzed:	9/18/96	9/18/96	9/18/96	9/18/96	
UIP Count:	>10	>10	>10	3	
Dil. Factor (%):	0.2	20	10	5	
Surr % Rec. (%):	91	93	98	97	
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	
Benzene	14,100.	7.4	417.	443.	
Chlorobenzene	<500	<5	<10	<20	
1,2-Dichlorobenzene	<500	<5	<10	<20	
1,3-Dichlorobenzene	<500	<5	<10	<20	
1,4-Dichlorobenzene	<500	<5	<10	<20	
Ethylbenzene	2,720.	8.9	<10	<20	
Toluene	4,710.	42.3	27.3	35.6	
Xylenes	13,300.	12.2	12.3	TBQ <20	
MTBE	33,600.	<5	1,190.	694.	

Notes: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

ENDYNE, INC.

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

19218

CHAIN-OF-CUSTODY RECORD

Project Name: Go Go Gas Site Location: Springfield, VT	Reporting Address: 1 Main St, Box C-5 Burlington, VT 05401	Billing Address: same
Endyne Project Number: GWVT 1153 (GW # 096-042)	Company: Ground Water of VT Contact Name/Phone #: R. Miller 860-6065	Sampler Name: Brian Steer Phone #: 343-1029

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
93,820	Trip Blank	W	X		9/13/96 705A	2	VOA		8020 + MTBE	I/HCl	
93,821	Duplicate				—						
93,822	MW-1				810A						
93,823	MW-3				830A						
93,824	MW-4				750A						
93,825	MW-5				915A						
93,826	MW-6				730A						
93,827	MW-10				845A						
93,828	MW-13				900A						

Relinquished by: Signature		Received by: Signature Kenneth R. Piccin P.Ex.	Date/Time 9/17/96 10:45
Relinquished by: Signature Kenneth R. Piccin P.Ex.		Received by: Signature John Smith	Date/Time 9/17/96 11:10 AM

New York State Project: Yes ___ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

REPORT OF LABORATORY ANALYSIS

CLIENT: GroundWater of Vermont
PROJECT NAME: GoGo Gas
REPORT DATE: October 5, 1996
DATE SAMPLED: September 27, 1996

PROJECT CODE: GWVT1367
REF.#: 94,484 - 94,488

Enclosed please find the results of the analyses performed for the samples referenced on the attached chain of custody. Chain of custody indicated sample preservation with HCl.

All samples were prepared and analyzed by requirements outlined in the referenced method and within the specified holding times. All instrumentation was calibrated with the appropriate frequency and verified by the requirements outlined in the referenced method. Blank contamination was not observed at levels affecting the analytical results.

Analytical method precision and accuracy was monitored by laboratory control standards which included matrix spike, duplicate and quality control analyses. These standards were determined to be within established laboratory method acceptance limits.

Individual sample performance was monitored by the addition of surrogate analytes to each sample. All surrogate recovery data was determined to be within laboratory QA/QC guidelines unless otherwise noted.

Reviewed by,

Harry B. Locker, Ph.D.
Laboratory Director

enclosures

ENDYNE, INC.

Laboratory Services

32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333
FAX 879-7103

EPA METHOD 8020--PURGEABLE AROMATICS

CLIENT: GroundWater of Vermont
PROJECT NAME: GoGo Gas
CLIENT PROJ. #: V96-042

DATE RECEIVED: October 3, 1996
REPORT DATE: October 5, 1996
PROJECT CODE: GWVT1367

Ref. #:	94,484	94,485	94,486	94,487	94,488
Site:	MW-16	MW-17	MW-19	Trip Blank	Duplicate
Date Sampled:	9/27/96	9/27/96	9/27/96	9/27/96	9/27/96
Time Sampled:	8:50	9:20	9:40	7:15	NI
Sampler:	B. Starer	B. Starer	B. Starer	B. Starer	B. Starer
Date Analyzed:	10/4/96	10/4/96	10/4/96	10/4/96	10/5/96
UIP Count:	0	0	>10	0	>10
Dil. Factor (%):	100	100	100	100	100
Surr % Rec. (%):	95	93	92	96	94
Parameter	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)	Conc. (ug/L)
Benzene	<1	<1	TBQ <1	<1	TBQ <1
Chlorobenzene	<1	<1	<1	<1	<1
1,2-Dichlorobenzene	<1	<1	<1	<1	<1
1,3-Dichlorobenzene	<1	<1	<1	<1	<1
1,4-Dichlorobenzene	<1	<1	<1	<1	<1
Ethylbenzene	<1	<1	<1	<1	<1
Toluene	17.5	14.7	3.3	<1	3.4
Xylenes	<1	<1	<1	<1	<1
MTBE	80.1	12.9	44.4	<1	47.8

Note: UIP = Unidentified Peaks TBQ = Trace Below Quantitation NI = Not Indicated

19229

ENDYNE, INC.
32 James Brown Drive
Williston, Vermont 05495
(802) 879-4333

CHAIN-OF-CUSTODY RECORD

Project Name: Go Go Gas Site Location: Spring Cell, UT	Reporting Address: 1 mill St Box C-5 Burlington VT 05401	Billing Address: Same
Endyne Project Number: GWVT 1367 (GWVT #96-042)	Company: Ground Water of UT Contact Name/Phone #: 860-6065 B. Miller	Sampler Name: Brian Stone Phone #: 560 6065

Lab #	Sample Location	Matrix	GRAB	COMP	Date/Time	Sample Containers No.	Sample Containers Type/Size	Field Results/Remarks	Analysis Required	Sample Preservation	Rush
94,484	mw-16	W	X		9/27/96 850A	2	VOA		8020 + MTBE	HCl	
94,485	mw-17	↓	↓		↓ 920A	↓	↓		↓	↓	
94,486	mw-19	↓	↓		↓ 940A	↓	↓		↓	↓	
94,487	Trip Blank	↓	↓		↓ 713A	↓	↓		↓	↓	
94,488	Duplicate	↓	↓		↓ -	↓	↓				

Relinquished by: Signature [signature]	Received by: Signature Mary R. Piccin	Date/Time 10-3-96 1045
Relinquished by: Signature	Received by: Signature [signature]	Date/Time 10/3/96 1120

New York State Project: Yes ____ No X

Requested Analyses

1	pH	6	TKN	11	Total Solids	16	Metals (Specify)	21	EPA 624	26	EPA 8270 B/N or Acid
2	Chloride	7	Total P	12	TSS	17	Coliform (Specify)	22	EPA 625 B/N or A	27	EPA 8010/8020
3	Ammonia N	8	Total Diss. P	13	TDS	18	COD	23	EPA 418.1	28	EPA 8080 Pest/PCB
4	Nitrite N	9	BOD_5	14	Turbidity	19	BTEX	24	EPA 608 Pest/PCB		
5	Nitrate N	10	Alkalinity	15	Conductivity	20	EPA 601/602	25	EPA 8240		
29	TCLP (Specify: volatiles, semi-volatiles, metals, pesticides, herbicides)										
30	Other (Specify):										